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Energy renovation in Germany: success story or potential failure?

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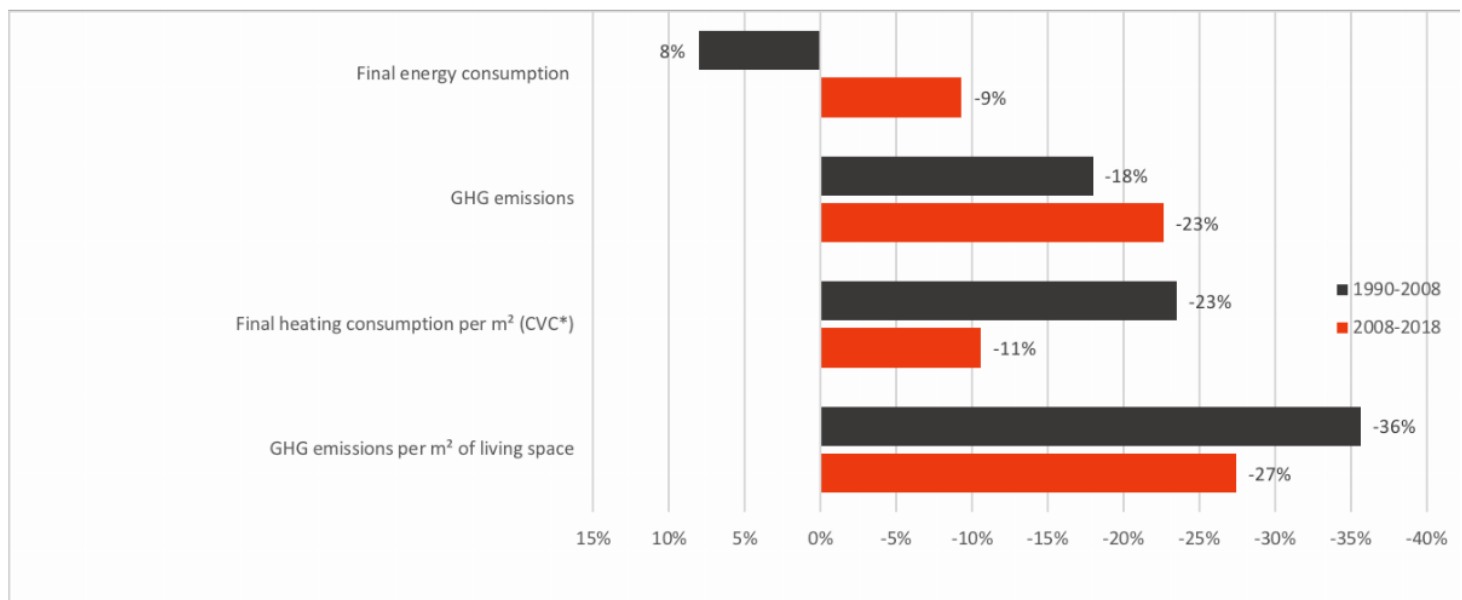
On 4 October 2020, *Le Monde* published an [article](#) on the energy efficiency of Germany's building stock, claiming that consumption has not been reduced, that energy retrofitting policies have failed, and that the sector's CO2 emission reduction targets were unlikely to be achieved. Given that Germany is often cited as a source of inspiration in this respect, as indicated by the [High Council on Climate's](#) recent report, how should we interpret these assertions? And what lessons can be learned by France? Andreas Rüdinger, a specialist on the issue in both France and Germany, and an IDDRI research associate, analyses the issue.

Continued decline in energy consumption and GHG emissions

The article in *Le Monde*, which is based on a presentation by the German Federal Association of Housing and Real Estate Companies (GdW), highlighted the fact that the billions invested in energy renovation have not had a noticeable effect on the sector's energy consumption and CO₂ emissions, particularly during the last ten years.

This very negative assessment, however, does not seem to reflect the statistics,¹ shown in the graph below, which compare how a number of indicators have changed during two time periods (1990-2008 and 2008-2018) to verify in particular the hypothesis that there has been a “stagnation” in terms of energy efficiency improvement over the last 10 years.²

Change in energy-climate indicators for German residential sector between 1990 and 2018



*CCV : correction for climatic variations

Source: IDDRI, data [BMW 2020](#).

- Final energy consumption in the residential sector was broadly stable in Germany between 1990 and 2018, with an 8% increase between 1990 and 2008, followed by a 9% decrease over the last 10 years. Unit energy efficiency gains (per m²) have therefore been strongly offset by the growth in the residential surface area (36% since 1990).
- CO₂ emissions from the residential sector are continuously decreasing and in 2018 were 37% lower than in 1990 (44% lower including the tertiary sector). In contrast to the apparent conclusions of the article, this decrease amounted to 23% over the last ten years (2008 to 2018), which is much more than the 18% drop achieved between 1990 and 2008.³
- Final energy consumption per m² for heating (adjusted for climatic variations) shows a 23% reduction between 1990 and 2008, and one of 11% between 2008 and 2018, reflecting a slight decline in the trend.⁴
- Similarly, GHG emissions per m² of living space have fallen sharply (53% decline since 1990), a trend that has accelerated over the last ten years (27% reduction).

So, what should be the take away message of this data analysis? Firstly, that a failure in the performance of energy renovations in Germany over the last 10 years does not seem to be borne out by the data. In reality, the annual GHG

emissions reduction rate has actually accelerated significantly over the last 10 years, as shown in the table below.

Regarding the final heating consumption per m² indicator used by the GdW and in the article in Le Monde, a slight slowdown in the rate of improvement over the last 10 years can be observed, although this does not equate to a stagnation. The impact of corrections for climate variations can also be noted: in “real” terms, final energy consumption per m² has fallen much faster over the last ten years than previously (last column in the table). While deciphering the change in this indicator remains difficult and requires specific analysis, it must be emphasized that this indicator does not reveal much about the efficiency of energy renovation, since it concerns the entire residential stock and not only the buildings that have been renovated.

Table 1. Comparison of average annual growth rates of different indicators over two time periods

Final energy consumption

GHG emissions

GHG emissions per m² of living space

Final heating consumption per m² (CCV)

Final consumption per m² (actual, without CCV)

1990-2008

0.43%

-1.09%

-2.42%

-1.48%

-0.92%

2008-2018

-0.97%

-2.54%

-3.16%

-1.11%

-1.60%

Source: IDDRI, data [BMW 2020](#)

The economics of energy renovation: a difficult debate

The article in *Le Monde* also stresses that energy savings do not compensate for the cost of work. Worse still, that energy retrofitting could act as a driver of rent increase, often disproportionately. These claims, however, are not backed up with any explanations or sources,⁵ and the assessment of the economic risks of energy renovation is as controversial as it is complex, and deserves greater transparency and objectivity.

At first glance, it seems essential to clarify the scope of the “costs” and “benefits” considered. Numerous studies (in France and Germany) have based their calculations on “full investment cost”, which means that all renovation costs are associated with the objective of improving energy performance.

In other words, this approach overlooks the fact that the majority of investments actually constitute maintenance or modernization expenditure, the primary purpose of which is not to improve energy performance: windows are changed because they are outdated; boilers are replaced because they break down; and facade renovation is primarily based on aesthetic considerations.

However, to analyse the cost-benefit ratio of energy efficiency improvement, we must consider the additional costs that are directly related to improving energy performance: wall and roof insulation is one of these costs, along with the additional cost of high-performance windows as compared to “standard” windows, of a highly efficient boiler compared to a mid-range boiler, etc.

Are energy efficiency improvements “profitable” for both landlords and tenants?

DENA, the German Energy Agency, found the following interesting [results](#) when distinguishing between these two types of costs, and analysing the feedback from 350 energy efficiency renovations in rental buildings:

- Additional costs directly linked to energy performance represent between 33% and 50% of the total costs of the renovation (between €80 and €230 per m², out of a total cost of €275 to €420 per m² to achieve “low or very low consumption” performance levels).⁶
- For the majority of projects⁷ it is possible to offset the additional costs of energy performance through an increase in rent, that remains lower than a tenant’s energy savings, thus avoiding any increase in a tenant’s expenses: the full cost of a dwelling does not increase, despite greatly improved comfort.
- With the inclusion of public funding, the cost of renovations can be almost entirely offset by a combination of funding and a “neutral” rent increase for the tenant (less than the energy savings). · Due to the progressive nature of renovation grants, which are closely tied to the performance achieved once works have been completed, the investment remaining at the landlord’s expense is much lower (€49 compared to €112 per m²) for renovations aimed at achieving the highest performance levels (*Effizienzhaus 55*) than for lower efficiency renovations (*Effizienzhaus 100*).
- Finally, regarding the verification of actual consumption following renovation, another [DENA study](#), carried out on 63 projects, showed that initially forecasted energy savings (80% average reduction) were indeed achieved, as demonstrated by the measurement of actual consumption two years after the completion of work (76% reduction), thus disproving the suggestion that a rebound effect would wipe out a large part of the energy savings.

How can 2030 targets be reached?

Is the 2030 emission reduction target for German buildings unattainable? Should we “abandon energy renovation and increasingly expensive insulation and opt for decentralized low-carbon energy production”, as the Director of GdW seems to suggest?⁸

In Germany, as in France, the findings seem clear: a continuation of the current trend would mean that achieving emission reduction targets for buildings (67% reduction for Germany, 53% for France by 2033) would be very difficult. However, these targets would not be unreachable if there was a major acceleration in energy efficiency improvement, and if incentives and regulatory policies were to be consistently strengthened.

As the High Council on Climate states in its report “*Rénovons mieux : leçons d'Europe*” (Better renovation, lessons from Europe), this requires, first and foremost, a rapid increase in the number of high-performance energy renovations, based on several complementary levers:

- a unique support scheme combining loans and grants, indexed to energy performance and associated with monitoring after the completion of work, inspired by the [German scheme](#);
- substantial support for low-income households, as part of a just transition process;
- a broader renovation obligation, as proposed by the [Citizens' Climate Convention](#), combined with the introduction of appropriate support mechanisms (one-stop shop) and funding arrangements;
- structuring of an overall renovation initiative on a territorial level, capable of responding to the scale up of projects and, above all, of regaining the trust of households through high quality work, including performance monitoring.

Although highly ambitious, this agenda also has very positive aspects. The dilemma between demand management and energy decarbonization, which is so often in the media spotlight, is no longer relevant: faced with the dual objective of climate neutrality and a just transition, all levers for action must be mobilized to the full extent of their potential.

¹ Data used in this article comes from two sources: the energy data spreadsheet published by the German Ministry of Economics (BMWi) available online. And the September 2020 BMWi publication entitled “Energy Efficiency in data”.

² It should be noted that final consumption in the residential and tertiary sectors increased by 17% over the same period in France, according to energy balance data.

³ In France, the decrease in GHG emissions from the residential-tertiary sector reaches 11% between 1990 and 2018 according to CITEPA data. The largest reductions on the residential side (23%) are partly offset by tertiary increases (15%).

⁴ Without taking into account corrections for climatic variations (CCVs), heating consumption per m² fell by 15% between 1990 and 2008 and by 15% between 2008 and 2018, which would indicate a clear improvement (AAGR of -0.92% in the first period and -1.6% in the second period). Due to CCVs, choice of reference year (e.g. 2008 or 2010) will have a major impact on results. Widely quoted by the article in Le Monde, the presentation of the annual report of the GdW seems to give a different picture. According to the graph on page 21, rents in Germany increased by only 28% on average between 2000 and 2020, i.e. less than inflation (33%). Conversely, the price of heating energy increased by 72% over the same period (doubling in 2008 before declining, in line with the fall in fossil fuel prices); and the price of electricity increased by 123%. Consequently, the rapid rise in energy prices supports an acceleration of energy renovation efforts.

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⁶ The renovations in question have led to the establishment of “Effizienzhaus 100” and “Effizienzhaus 55” standards. These standards indicate that the energy consumption per square metre is equivalent to 100% and 55% of a new building, respectively. The “Effizienzhaus 55” standard is equivalent to 40 kWh of final energy per square metre for heating and hot water use, a figure that increases to 80 kWh in the “100” standard.

7 Only the achievement of the most ambitious level of performance (“Effizienzhaus 55”) shows a gap of around 15% between the additional cost of energy performance to landlords, and a “neutral” rent increase (less than the energy savings) for the tenant.

8 One may wonder whether this is an error in the translation: the GdW federation does not seem to share this all-encompassing criticism of energy renovation. On the contrary, in July 2020 it published an analysis of the investment needs for an ambitious renovation strategy. It stated that: “only a high rate of renovation combined with a significant improvement in energy performance aimed at achieving the ‘KfW 55 Efficient House’ level seems appropriate to achieve the climate objectives”. The study concludes by calling for the mobilization of 6 to 14 billion euros of public funds to enable these investments to be carried out in a way that would be economically neutral for tenants.

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